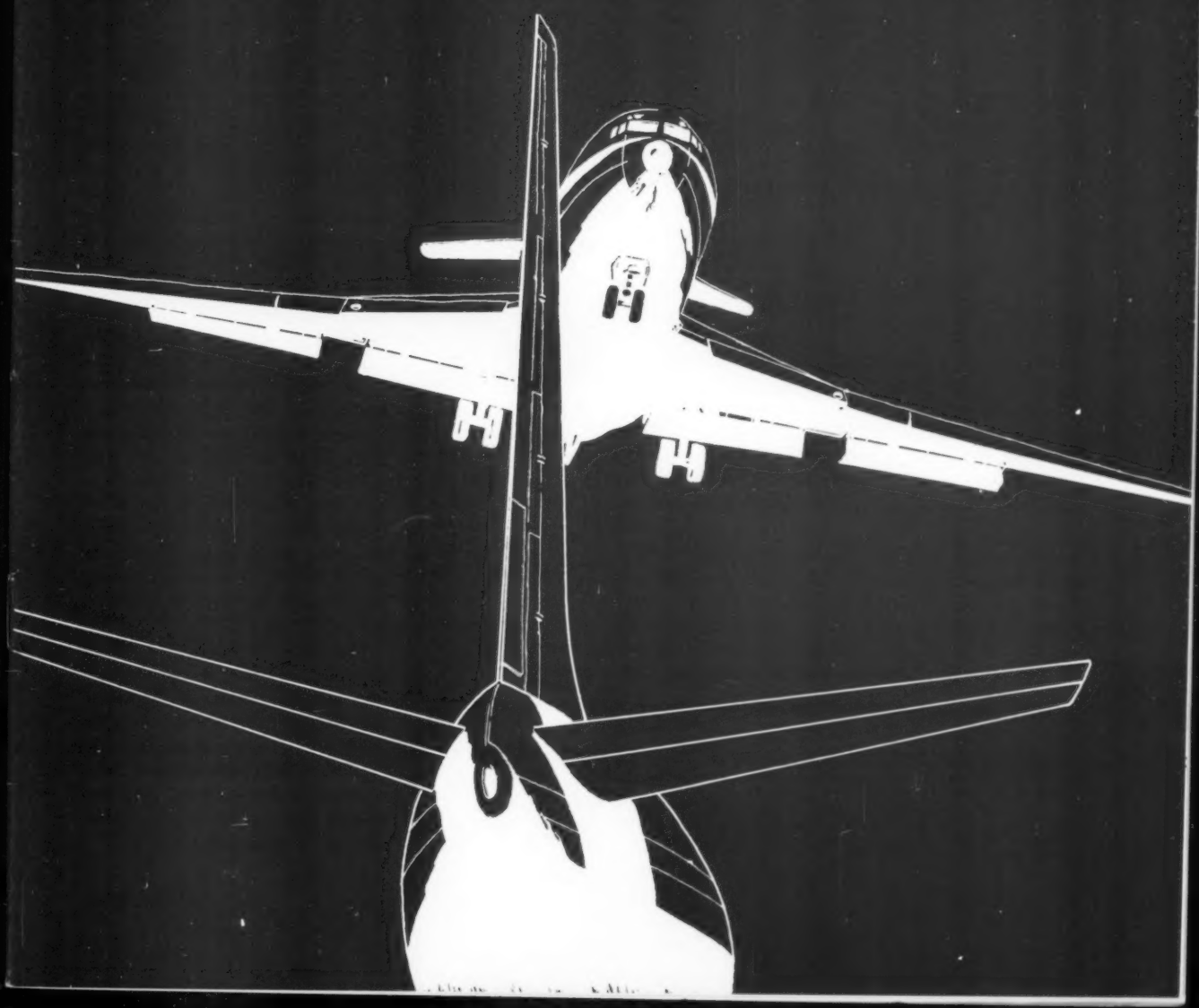
The MAC Flyer

JULY 1972



MILITARY AIRLIFT COMMAND
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For Greater Efficiency
in MAC Air Operations

The MAC Flyer

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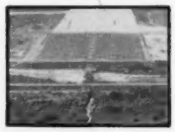

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COVER: Confusion can be dangerous. Check page 16.

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Squawk Box

Happy New Year! *Fiscal* new year, that is. Didie-draped baby FY 73 just elbowed his withered and creaky forerunner aside, and the knots on the purse strings are undone after the late spring dollar drought. Paper towels return to latrines, courier flights are clogged by re-funded staff visitors, PCS season is in full swing, and IG teams lurk and skulk with fresh vigor and cash.

The first of the year is also a special time for your fly safe mag. For example, we usually bid farewell to one staff member (this one is going to Hickam) and start training his replacement (a highly qualified chopper jock; a first for TMF).

'Nother example: In July we bring you the best of the most recent writing contest. This year, though, for the first time ever, we cannot continue that tradition. The outstanding first place story (the best contest winner I've ever read), by Lt Michael O'Neill from McGuire's 18 MASq, dealt with a highly sensitive subject: hijacking. Unfortunately, discussing hijacking publicly has the unhappy faculty of producing more of the same. And Lt O'Neill's yarn was so real that MAC Safety and Operations agreed we'd best *not* pass the word to the world at large. Our position was quite well summed in an editorial by radio station WHN in New York: "As responsible journalists, we would prefer *missing* the air crime story — to perhaps making others *happen* by glorifying the sickness."

Success in preventing air crimes depends greatly on keeping our methods of detection and apprehension shrouded in secrecy. As FAA put it, "Too many cats are out of the bag." Lt O'Neill joins in our decision to withhold this story and deny any possible source of injury to any MAC aircrew or passenger.

Piecing a huge jig saw puzzle together is no easy job. This was the task of the investigation team in . . .

The Case of the Fragmented Blades

THE AFTERNOON SUN AND HUMIDITY soaked into Jeb Wilson as he stepped harder on the gas pedal in an effort to shorten his trip to the farm. Even with the car windows rolled down and the air vents wide open, it was hot.

"Looks like it might be cooling off soon," he thought as he scanned the thunderstorms several miles ahead of him. Rain showers were already visible at the bases of the low-hanging clouds. A sharp gust of wind rocked the car as he neared the turnoff for the farm. "Probably just like yesterday," Jeb thought, remembering the driving showers and high winds that came shortly before dusk.

He glanced up toward the clouds again, and noticed an Air Force HH-43 helicopter crossing the road in front of him. "He looks lower than usual," Jeb mused. "Must be because of the low clouds." He also noted a bolt of lightning to his right.

by Lt Col Robert D. Brubaker
Air War College (AU)
Maxwell AFB, AL

Jeb looked back at the helicopter just as a second bolt of lightning flashed near the aircraft. "And then," as he later recalled, "the blades on the helicopter just seemed to come apart, and the whole thing fell to the ground."

Jeb stopped his car and ran to a nearby farmhouse to have the farmer telephone the air base. Then he scrambled through heavy undergrowth and swampland to help the survivors, but there were none.

The Investigation

Within hours, Jeb Wilson was relating his story to the accident investigating board. Besides Jeb Wilson, more than 50 people living near the crash site, or driving or flying through the area, were interviewed.

Nine days were spent searching for, locating, marking, and surveying the aircraft wreckage. Each piece was marked and returned to the base, where components were reconstructed. As many as 60 persons combed the area in search of missing parts — thousands of pieces of the wooden rotor blades.

Engineers from the aircraft manufacturer and the helicopter-support air materiel area helped the accident board reassemble the aircraft wreckage.

These experts could not find any indications that the rotor break-up had been caused by blade-to-blade contact. But, their careful examination of the rotor fragments did disclose some unusual fractures. These were extreme separation (delamination) of some of the plies of the wood veneer rotor blade skin. The same sort of separation was found between the bonded glass fabric cover and the veneer. Normally, skin fractures are predominantly jagged and splintered, with only a little delamination near the break.

In addition, the investigators found some unusual small "burned" areas on three of the rotor blades. The accident board felt that these areas might have been caused by lightning strikes on the blades and requested expert assistance.

Air Force Systems Command technical advisors were called in as well as experts from a civilian organization, the Lightning and Transients Research Institute (LTRI). After examining the blades, the specialists felt a need to perform lightning strike tests, so a duplicate set of rotor blades was shipped to the LTRI test facility.

While the lightning tests were being conducted, the board directed its attention to other possible causes of rotor blade disintegration: flight control malfunction, severe wind gust, foreign object, pilot control, or a combination of these.

A flight control malfunction — a hard-over condition with full left or right rudder — was ruled out. Preliminary Air Force acceptance tests of the aircraft had proved that a hard-over could be handled by pilots at speeds up to 110 knots. The aircraft had been traveling at only 70 to 80 knots.

A gust load on the blades, from a tornado or funnel cloud, could have disintegrated the rotor system but the board did not consider this cause probable. No such weather had been reported and there was no evidence of blade-to-blade contact.

A hard-over in combination with the gusty 25- to 45-knot winds present at the time of the accident possibly could have produced an uncontrollable situation, but this was ruled as not probable. This condition would have produced a yaw with substantial nose-down pitching, but the board believed this to be a controllable situation. It was also difficult to see how a condition of hard-over with turbulence could have generated failure of more than one blade. In this accident, pieces from the spring-constant area of two of the blades (where the blades bend upward during flight) had departed early in the disintegration process. Failure of more than one blade in the spring-constant area is an extremely remote possibility. Had only one blade developed a fail-

ure (crack), it would have produced an out-of-balance condition that probably would have allowed the pilot time to execute a safe landing.

A bird strike was considered but ruled out. All blade flaps were found in good condition, and no bird particles were found on the flaps or blades.

The board also considered whether the rotor blades could have been forced into the aircraft empennage or tail boom by the pilot's application of aft cyclic control after encountering a gust or other outside force. This wasn't considered probable, even though a left hand rotor blade did strike the left tail boom. Rivet marks and paint on the leading edges of the blade proved that the blade strike took place after the left hand rotor shaft and blades had departed the aircraft.

The Answers

The lighting tests at the LTRI test facility soon produced interesting results. With the test blade static and under no load, the specialists applied artificial lightning equaling 150,000 amperes, about the current level found in natural lightning. The charge struck the blade near the tip at the beginning of the stainless steel leading edge. The lightning ripped a large hole, measuring 10 inches chordwise and 21 inches long, in the rib cage behind the spar, and a 3-inch portion of the stainless steel leading edge was pulled away from the spar. The top and bottom blade skins, and parts of the interior rib cage, were blown in small pieces over an area of about 25 feet. The testers found delamination of fiberglass from wood, and of wood plies from other wood plies, as well as separated glue joints. They also found blemishes and burn-like marks on various parts of the blade in and around the strike area.

The blade damage was identical to the damage on the blades from the accident.

By reconstructing the events, the board was convinced that the helicopter had, indeed, been struck by lightning which caused massive damage to the rotor blades almost instantaneously. Internal explosions within the box sections of the blades and delamination of portions of the blade structure (plywood and fiberglass) produced an extreme, out-of-balance condition in the rotor system. This condition immediately began to tear the rotor drive system out of the aircraft, breaking up the rotor blades and causing the crash.

But our story does not end here. The board then recommended that lightning strike studies be conducted on all types of helicopter blades, including tail rotors. These tests were to determine what damage could occur during a lightning strike and how the blades could be protected.

More Tests

Lightning strike tests of the H-1, H-3, and H-53 main and tail rotors indicated that the blades could be damaged, but probably not catastrophically as had happened in the HH-43. The leading edge erosion strips on the main rotor blades of these helicopters generally suffered little damage. However, these metal blades have adhesive joints that cannot fully conduct lightning current. When a strike occurs, there is arcing and internal pressure buildup in the adhesive area which causes some damage, usually at the trailing edge of the blade where the lightning stroke tends to hang on.

In the H-3 and H-53, the worst damage occurred when a stroke contacted the main blade at midchord or at a joint between two blade pockets (sections of the blade). The stroke then exited on a joint between two other pockets after sweeping chordwise across the blade. This type of strike could destroy two or more blade pockets, but did not damage the blade spar. In-flight damage like this would be instantly detectable to the pilot but the aircraft would be easily controllable.

The H-1 main blades have no pockets, but when a lightning stroke hung on to the trim tab at the trailing

edge of the blade, the tab — which is made of two pieces adhesively bonded together — could be delaminated. This could produce a strong 1:1 beat, but would be easily controllable.

The testers found that tail rotor blades were generally less vulnerable to lightning damage than main rotor blades. However, the H-3 tail rotor blade, constructed of metal honeycomb, was deformed by a high current discharge. The H-1 tail rotor blades are also metal honeycomb, but these showed little or no significant damage.

In addition, the simulated lightning discharge caused some temporary binding and roughness in the bearing and ball joint operation of the hub assembly.

Tests on the wooden blades of the H-43 proved that any penetration of the blade skin by a lightning stroke could produce enough internal pressure to cause the blade to virtually explode. To prevent this possible penetration, engineers proposed that the blades be covered with an electrically conductive paint.

A Fix

Two modifications were developed. One could be applied by units in the field and the other was designed to be incorporated during factory overhaul of the blades. Both modifications use metallic, high silver content, conductive paint and metallic conductors secured to the exterior of the blade. The unit-applied kit was subjected to a total of 40 lightning strokes. The only significant damage was several cracks in the blade flap skin; these presented no control problem in flight. The factory-overhaul kit, after testing, showed no structural damage.

Prototype blades, consisting of one pair of contractor-modified blades and one pair of blades modified by a field unit, were installed on an aircraft in May 1971. The blades went into immediate service, accumulating over 150 hours in all phases of H-43 operation. Paint integrity and possible communications interference tests proved satisfactory.

Metallic paint is now being applied to all H-43 blades at overhaul, and kits are being delivered to units having long life blades on hand.

Your Part

Though action is being taken to provide more protection, lightning is still a hazard to helicopters. So what can you, as a helicopter pilot, do to avoid the dangers of lightning?

First, keep in mind that your chances of being struck by lightning are extremely rare. The aircraft we've discussed is the *only one* (and this includes Army, Navy and Marine experience) that has been struck by lightning in flight (a few have been struck while parked on the ground).

Second, closely monitor the weather conditions and forecasts for all proposed flights and alert periods.

Third, be aware of aircraft limitations as indicated in your flight manual.

Fourth, evaluate mission urgency against the hazards involved before you launch or continue a mission when thunderstorms or other severe weather may be encountered. If you are already in flight, use all available means to monitor weather conditions and to avoid severe weather areas. These means include flight service stations, ARTCC, PIREPS, pilot-to-forecaster service, approach radar facilities, and GCA.

Finally, remember that your rotary-winged wonder is a unique vehicle — it can land almost anywhere. This is your ace in the hole, and a lot of "stiff-wing" pilots have wished at times that their craft had this option.

So, if you can't avoid the severe weather, consider the easy alternative — making a precautionary landing to await the storm's passage.

GOOD SHOW
MILITARY AIRLIFT COMMAND

Trouble: what you're in with two engines shut down on one side of a four-engine airplane.

ONE AFTERNOON LAST FALL, Major Larry A. Granquist and his crew, from the 53d Weather Reconnaissance Squadron at Ramey, took off on a functional check flight in a WC-130B. The first part of the flight went smoothly and offered the crew no clue that before they were back on the ground they would face a serious in-flight emergency.

Following the standard check flight procedures, Major Granquist leveled the Hercules at flight level 195 and prepared to test the aircraft's fuel dump system. The dump system was actuated, but for 30 seconds the crew saw no indications that fuel was actually being dumped. Suddenly, a scanner saw fuel streaming off the trailing edge of the left wing — right next to the jet exhaust from number one engine! The attempt to dump fuel was immediately terminated and the number one engine was shut down. The flight engineer scanned the left wing and noticed that fuel was still pouring out and was flowing over the wing close to the number two engine — *too* close. Number two engine was shut down, and the now twin-engined transport was turned toward home.

Nearing Ramey, Major Granquist considered the possible presence of raw fuel and fuel fumes in the flap well, and decided to make a no-flap approach and landing. With both engines on the left side shut down, the aircraft's utility hydraulic system was inoperative; the landing gear would have to be cranked down and there would be no nosewheel steering or anti-skid protection available during the landing.

After the wheels were cranked down and locked, Major Granquist set up his approach and smoothly landed the stricken aircraft on the center of the runway. During the rollout, he maintained directional control by using a combination of flight controls and, as the airspeed bled off, wheel brakes. Major Granquist brought the aircraft to a stop on the runway, shut down the remaining engines, and ordered evacuation. As the crew scrambled out, JP-4 was still dripping from the left wing.

After the mishap, investigators discovered that the massive fuel leak had been caused by improperly torqued Wiggins fittings, which connect sections of the fuel dump manifold.

Major Granquist's outstanding display of airmanship and exceptional skill during this complex emergency earned him a congratulatory message from General Catton. THE MAC FLYER is proud to add, *Good Show!*

A Safety Classic:

Married Men are the S

YES, BACHELORS, NOW IT'S A PROVED FACT. I have in my hands a report which says married pilots, navigators, and engineers are the safest crewmembers in the flying profession. In fact, many insurance companies won't even insure a pilot unless he has stood in front of a preacher and uttered "I do."

However, before any of you happy, fun-loving, non-suffering bachelors get panicky and run out and throw away two dollars on something that's not in a bottle, let's analyze this report. You might decide the flaming transport is preferable to the flaming tongue. And for the record, the survey people were all married, had mean mothers-in-law, and owed every credit company in town.

Here are their two basic findings.

★ Number one: Married men know their aircraft and equipment better than bachelors — because they read and review their Flight Handbooks and procedures more often. I know this is a true statement. At my house, for instance, every time my wife gets mad I go off into the corner and read my Dash One. *Last month I read for 28 straight days!* The rest of the month I spent in the library reading about poisons and studying the life of Henry VIII.

On the other hand, the bachelor who lives next door to me hasn't picked up his books *all month.* I hear him coming in every morning about oh-two-hundred, laughing loudly, shouting to some girl. And then his stereo starts blaring and they do the latest dance steps the rest of the night. How disgusting!

Honestly, I lie there almost in tears, thinking that this man should be such an unsafe crewmember! Sure, he knows lots of girls. Sure, he's having

by J. B. Knighten

Safest Crewmembers

lots of fun. *But is he studying?* I even offered to go over and do the dance steps one night with his guest while *he* studied *his* Dash One. And would you believe it, the *Unsafe Ingrate* refused my offer! And I shudder to think that he's been doing this for years! But of course, he's just lucky — and who wants to depend on luck? No! No! Every crewmember must continually review his procedures, and study the Dash One to be as safe a crewmember as possible.

★ Number two: Married men are more responsible for their equipment, have an acute sense of values, and are less inclined to take chances. And to this there are no arguments. The survey showed that the average married man had one suit, one uniform (lightweight year 'round), three shirts, and one pair each of black and brown shoes; his wife had thirty cocktail dresses, forty-seven pairs of shoes and six coats. He was buying two cars, had a thousand dollars worth of broken toys in the garage, and had first claim on an old push-type lawn mower. Such an accumulation of old, well used commodities shows responsibility. Of course, these things hadn't been paid for and this indebtedness makes the married man more likely to avoid taking chances. He knows if anything happens not only will his family suffer, but half the banks in town will go bankrupt.

In contrast, the Unsafe Bachelor owns nothing but a Jaguar, some stereo equipment, six cameras, twenty suits, ten sport coats, four tape recorders and a thousand shares of IBM. How irresponsible can you get? Would you want to fly with someone like that?

Obviously, married men must be the safest crewmembers. All those hours spent with the Dash One, and all those financial obligations guarantee it. *Don't you feel sorry for those poor, unsafe bachelors?*

Several months ago, we asked you to "Speak Up!" Here's a report on what you said.

Diagnosis: Alive and Kicking

IN OUR FEBRUARY ISSUE, we asked you to tell us what you like and dislike about THE MAC FLYER. We included four reader response forms as an easy-to-remove centerspread in that issue, and we dreamed of a response far surpassing previous surveys — perhaps even 1,000 replies. Well, we watched the trickle for two months, constantly hoping the flow would turn into a mini-flood. Then we resigned ourselves to the facts that maybe we don't affect most readers much one way or the other, and that anything over 100 responses would be good enough to give us some ideas. At that point, we took the 147 sheets we'd received, grabbed a pad of yellow paper and a good stock of colored pencils, and began tabulating the results.

Who Responded?

First, let's look at our tally of responses according to type aircraft.

Figure 1. Type of aircraft of those responding

C-5	12	C-135/C-137	0
C-9	3	C-141	84
T-29/C-131/CV580	8	Helicopters	0
T-39	4	Other*	10
C-124	4	Non-rated	21
C-130	1	Total	147

*Includes non-MAC aircraft

It's interesting to note that almost 60 percent of our feedback was from C-141 people, with a reasonably good sampling of crew positions. In contrast, we had no replies — *none at all* — from helicopter crewmen, weather jocks, or photo-mappers.

The lack of rotary-wing participation is especially worrisome. About a year ago we had formal complaints through the ARRS safety councils that THE MAC FLYER was giving helicopter operations short shrift. Our study at that time showed we were giving fling-wings the same space as C-141s and C-5s combined, and a more recent page-count showed pretty much the same relationship. Have we lost an audience? As you will see later, the transport folks don't object to helicopter materials; nevertheless, we may be well advised to refocus on the airlift force.

In terms of age and crew position, here's how the respondees were divided:

Figure 2. Ages and crew positions

	Pilot	Navigator	FE/FM	LM	Non-rated	Total	Percentage
Under 21	0	0	0	3	2	5	4
21-25	12	0	2	5	4	23	16
26-30	19	1	1	1	5	27	18
31-35	15	8	4	5	4	36	24
36-40	15	2	12	2	1	32	22
41-45	5	0	2	2	3	12	8
46-50	5	0	1	0	1	7	5
Over 50	2	0	0	0	1	3	4
Not given	0	0	1	1	0	2	2
TOTALS	73	11	23	19	21	147	

For a typical crew, the loadmaster is in his early 20s, the pilots are just on the sunny side of 30, the navigator is in his early 30s, and the engineers are close to Jack Benny's magic 39. Although over half of the Air Force is under 25, only 20 percent of our readers fall below the 26-40 span, with another 18 percent above. In fact, over 60 percent of our readership is over 30.

What did they say?

So much for who took the time and effort to sound off; the big question now is, what did they say? Here's the overall summary, with the results expressed in percentages.

Figure 3. Overall responses

Feature/Type of Article	Dead	So-So	Okay	Great
Aerodynamics	4	15	54	29
Weather	5	19	56	22
Mishap/Accident Review	1	5	34	60
Maintenance	7	24	50	19
New Equipment	2	20	44	35
Transport Aircraft	3	8	46	42
Helicopters	15	34	42	9
Special Purpose Aircraft	7	24	52	18
Mission Support	8	32	47	14
Medical/Dear Doc	7	21	40	32
Good Show	4	18	42	36
Unit Specials	10	30	41	19
Interviews	13	32	34	20
COMAC Features	8	32	43	17
Photo Stories	3	17	45	35
Writing Contest Winners	16	20	29	35
Short Stories	6	18	36	40
C. R. Terror	10	8	18	64
Quick Stoppers	2	12	44	42
Silhouettes	10	22	44	25
Analyzer	3	17	47	33

(Note: Due to rounding, some may not total 100 percent.)

Based on the percentages, our best-liked offerings are: C. R. Terror, mishap/accident review, transport articles, and Quick Stoppers. Least liked: writing contest winners, helicopter pieces, and interviews.

Because we had such a large sampling of C-141 crewmen, we did a separate analysis on their responses. Figure 4 presents the details.

It's interesting that the percentages are almost identical — in other words, the non-C-141 responses were not different enough to change either the overall relationships or the best-liked and least-liked features. And here's another point: Though transport features and Quick Stoppers drew more "great" votes than did writing contest winners, plurality put both down in the "okay" category.

Figure 4. Responses from C-141 crewmen

Feature/Type of Article	Dead	So-So	Okay	Great
Aerodynamics	3	15	52	30
Weather	4	17	57	22
Mishap/Accident Review	1	4	35	60
Maintenance	8	23	50	20
New Equipment	1	19	52	27
Transport Aircraft	1	10	47	39
Helicopters	11	40	40	10
Special Purpose Aircraft	5	28	52	16
Mission Support	8	32	44	16
Medical/Dear Doc	7	21	43	29
Good Show	5	17	49	29
Unit Specials	8	33	42	17
Interviews	12	33	37	18
COMAC Features	8	30	45	16
Photo Stories	3	20	47	30
Writing Contest Winners	12	23	31	35
Short Stories	4	16	39	41
C. R. Terror	5	4	22	69
Quick Stoppers	0	14	49	37
Silhouettes	9	20	47	24
Analyzer	0	17	51	32

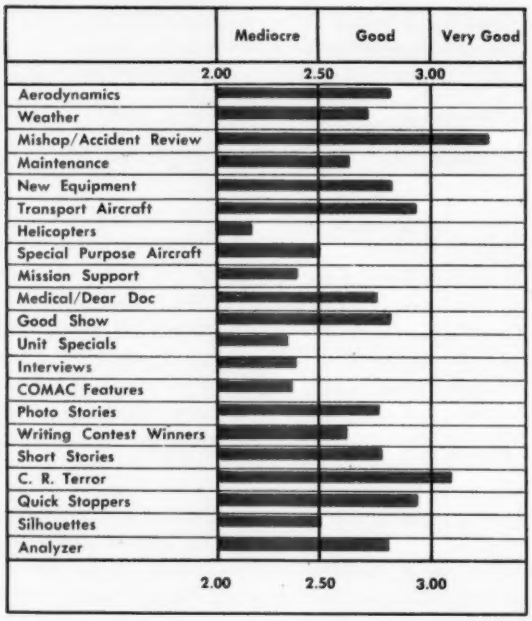
Two categories of material deserve special comment. First: C. R. Terror, the only feature which has endured throughout our 18-year history. We've heard comments of "outdated," "contrived," "old hat." And C. R. was identified as least liked by more readers (ten) than any other feature. Yet C. R. was one of only two features to draw "great" rating on almost two-thirds of the responses, and was picked as the best single feature by sixty of the respondents. Consequently, we feel he's pretty well liked — but we realize that he's over 40 and could stand some modernizing.

Next subject: writing contest winners. The rating for these were surprisingly widespread. At first blush, this means our audience has widely-divided opinions of fiction. But the response to the next category tends to disprove that idea: short stories *per se* were pretty well received. Apparently the quality and length of our contest winners, plus the appearance of one every month, have managed to turn some of you off. We solicit further comments.

Point Values

Now, to slice the data another way, we assigned point values to each response category: one point for "Dead" and four for "Great." Then we multiplied each point value by the number of actual responses in that category, totaled the points for each feature, and divided by 147, the total number of responses. We felt that anything which wound up with a score of 3.00 or better was in the very good class — an extremely well-liked feature. There were two: Accident and mishap reviews, and C. R. Terror. Two-thirds of the features fell in the 2.50 to 2.99 or good range, with only five below 2.50 or mediocre. No single feature was so bad that we feel we should discontinue it as serving no useful purpose, though we may ration the frequency. Side note: We were fascinated at how well helicopter material was received — from our totally non-helicopter respondees.

Figure 5. Weighted Response Summary



Comments?

Near the bottom of the survey forms we asked for comments. And we got some interesting ones — not all of which can be shared via an open publication like this. Here's a short cross section of the printable reader observations:

- An excellent publication, interesting from cover to cover.
- Interesting to a pilot; blah to a loadmaster. (pilot)
- Devote more issues to a single topic — Feb was best issue I've ever seen.
- House organ; capitalist propaganda. (pilot)
- Tell more about crew problems — commanders read the book, too.
- I do not read The MAC Flyer. I do not like my job. I can read. (navigator)
- I don't read it.
- Keep C. R.!
- Can you mail it to my house? *(Note: Anyone can get a private subscription; see inside the front cover.)*
- So-So.
- Fair to partly cloudy.
- Decent mag.
- An excellent safety education tool. It continues to fill a vital need.
- Who thought up this dumb "Speak Up" idea?
- Excellent. I read it first after Playboy.
- Include a monthly IPIS Approach article by MAC Standboard.
- Lousey (sic)
- Add a centerfold or at least a "RON Kitten" such as in Professional Pilot magazine.
- Play down the goofy stuff.
- Don't forget the Reserve Forces.
- Thanks for giving me a chance to voice my opinion.
- The MAC Flyer comes across as anti-ladies (women and female). To improve it, stop thinking of women as entirely dumb, incapable, and nothing but bed partners. (job title: Mrs.)
- Quite informative and enjoyable.

Well, there you have it. There are more details but at least you have the big ones. For our dyed-in-the wool fans: thanks. For those who read and endure a little every month: we'll try to keep you in mind if you'll take time to tell us what you like or dislike. To the stepped-on toes, non-readers, and ban-the-book bunch, "BRAAAAACK!"

The MAC Flyer is alive and kicking, and we're gonna do our best to be your kind of magazine.

You take the low road and I'll take the high road and I'll get there safely before you.

KEEP 'EM HIGH

HAVE YOU NOTICED that ATC is keeping you at altitude until you are pretty close to your destination? Or, have you noticed that you're getting your final cruise altitude a lot sooner than you used to? These changes are a result of FAA's "Keep 'em High" program for high performance aircraft (turbojet and turboprop) arriving at or departing from FAA controlled airports. FAA Advisory Circular AC-90-59 explains the program, which is designed to keep you and your aircraft out of the high density, midair collision threat area as much as possible.

An FAA near midair collision study revealed that most near midairs occurred below 8,000 feet within 30 miles of an airport with a control tower. And the worst threat was at the lower altitudes — the area used most by both arriving and departing controlled and uncontrolled traffic. To reduce the exposure of controlled high performance traffic, FAA created the "Keep 'em High" program. It has been in effect for about 15 months within terminal areas and has reduced the number of near misses significantly. As a side effect, it has proved to be a very effective noise abatement program.

Here's how it works. FAA keeps you at 10,000 feet as long as possible before descending you to 5,000 feet above the field elevation. Then you stay at 5,000 feet until you enter the descent area for the landing runway. (So what's a standard descent area? See the diagram for details.) Incidentally, the upper limit of some descent areas is higher than 5,000 feet. For example, it is 6,000 feet if you are going into St. Louis-Lambert International.

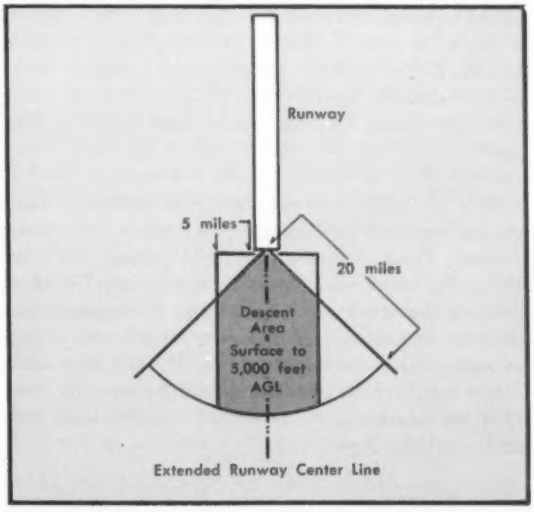
This concept gives you minimum exposure time in the high density lower altitudes. Additionally, on departure you will be cleared to your cruise altitude as soon as possible after takeoff, getting you out of the lower altitudes as quickly as possible.

FAA controllers will not issue clearances to arrivals or departures which will place aircraft at the lower altitudes used by uncontrolled traffic. Requests for altitudes below 5,000 will not be granted until you have entered the descent area for the landing runway.

Of course, there are always exceptions to the rule. At non-radar approach control facilities, exceptions are made to provide the controller with some flexibility. Also, controllers will modify these procedures for aircraft emergencies, thunderstorms, turbulence, local noise abatement, and other special problems.

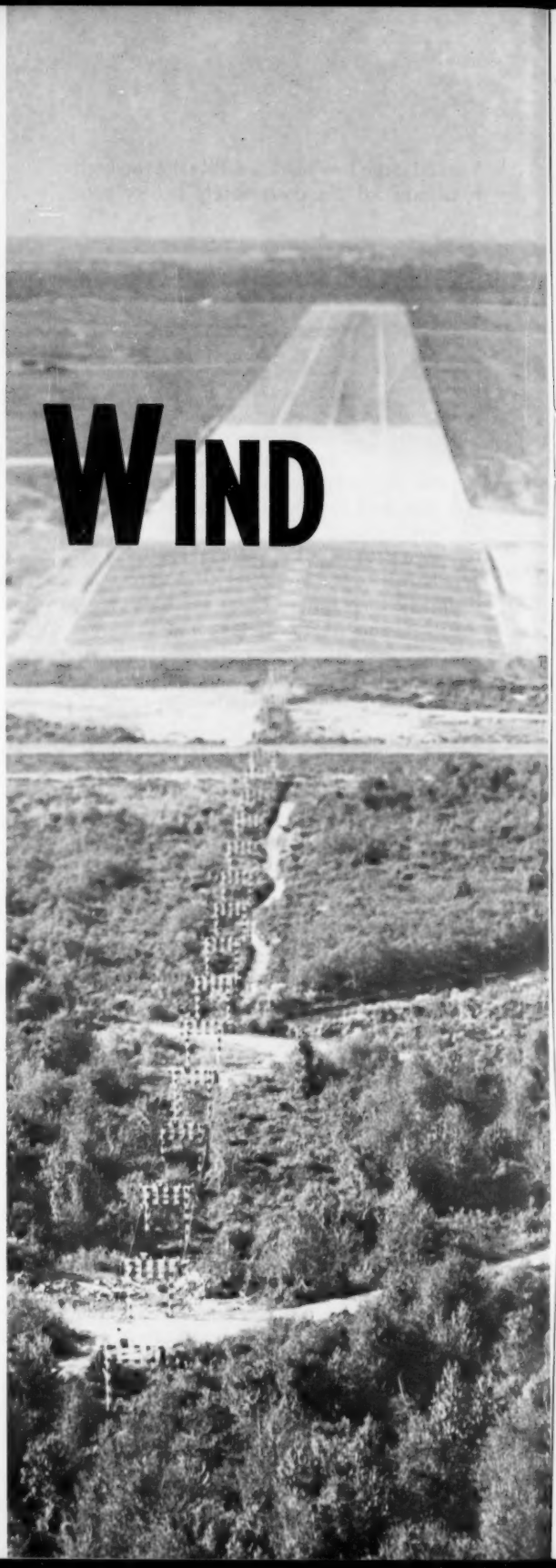
If you are a light airplane buff, or you would like to know more about your local "Keep 'em High" program, check with the FAA flight facilities chief. He normally issues bulletins describing local procedures. These depict descent areas and identify arrival and departure routes. The bulletins are mainly to help the VFR pilot identify and stay clear of high performance aircraft routes in terminal areas.

"Keep 'em High" is here to help you. While it helps keep you clear of high midair threat areas, it pleases the noise abatement officials. Next time you are held at 5,000 or 10,000 feet, you'll know the reason why. Just be patient, plan ahead, and you'll still have room and time to make a smooth and efficient letdown.



A brief reminder that there can be quite a difference between true and magnetic.

CHECK THAT WIND



MAC 60134, you're cleared to the Elmendorf outer compass locator at 5,000 feet. Contact Anchorage approach control now on 363.8."

"Roger, MAC 60134 changing to approach control."

* * *

"Anchorage approach control, this is MAC 60134 at 5,000 feet, requesting GCA."

"Roger, MAC 60134, you're loud and clear. Maintain present heading and altitude. Contact Alfa Charlie Papa for a wind advisory, over."

* * *

"Elmendorf ACP, this is MAC 60134. What about this wind advisory?"

"The winds have just gone out of limits and are expected to remain that way for three hours. We now have a direct crosswind on runway 5 with gusts to 30 knots. Runway 33 is closed for construction so I suggest you go to your alternate, over."

"Roger. Looks like the weatherman busted another one."

* * *

Hold it! Before you make any rash statements about the poor overworked forecaster, let's take a look at that forecast. Figure 1 shows Section IV of the DD Form 175-1. The forecast for Elmendorf was for good weather; however, the winds were questionable. The quickie check on crosswind component before departure was enough to raise your eyebrows, but it should have done more. Figure 2 is a typical takeoff and landing crosswind chart. (For the maximum recommended crosswind on your bird, check the Dash One.)

Elmendorf's primary instrument runway is 5; therefore, let's conclude the general direction (to the nearest 10 degrees) is 050 degrees magnetic. Now the forecast was for winds to be 350 degrees at 20 knots gusting to 30 knots. Taking the angular difference between the runway and wind, we find 60 degrees. Applying this to the chart using the maximum forecast wind of 30 knots, we come up with a crosswind component of 26 knots. Right? Wrong! Have you ever tried to add oranges and apples? We did almost that because we figured a crosswind component using magnetic runway heading and true forecast winds. True and magnetic are the same only in locations of zero degrees variation.

IV. TERMINAL FORECASTS

DESTINATION	CLOUD LAYERS	VIS/WEA	SFC WIND	ALTIMETER	VALID TIME
PAED	30 Φ	10	3520@30	3000 INS	2100 Z TO 2300 Z
ALTERNATE					
PAE 1	25 Φ	12	3315@25	2998 INS	2130 Z TO 2330 Z
INTMED STOP				INS	Z TO Z
INTMED STOP				INS	Z TO Z

V. COMMENTS/REMARKS

NDT TURBC LNDG AT PAED SFC-050

Figure 1. Section IV of DD Form 175-1

Elmendorf's variation is approximately 25 degrees east, making a substantial difference between magnetic and true wind directions. Remember the old saying, when changing from true to magnetic: "east is least and west is best?" The forecast true wind direction of 350 degrees becomes 325 degrees magnetic. Now let's do it right: Using a wind of 325 degrees and runway 5, the wind angle is 85 degrees. Entering the crosswind chart with 85 degrees and 30 knots, we get a crosswind of 30 knots instead of 26 knots. This four-knot difference could determine whether or not a landing is recommended when conditions are borderline.

* * *

Wind measurement on your charts is very important and should be considered very carefully. Each knot of crosswind or gustiness makes the takeoff and landing a little more difficult. The weatherman must measure the wind very carefully too. In the past, anemometers were placed on buildings, in the middle of engine runup areas, and just about every other place, but Air Weather Service has now come up with some recommendations for getting the best indication of touchdown winds. The anemometers should be 13 feet above the terrain and 500 feet (perpendicular distance) from the runway centerline at the touchdown point. Ideally, each runway should have an anemometer or wind sock at each touchdown point. If not, speak to your safety officer.

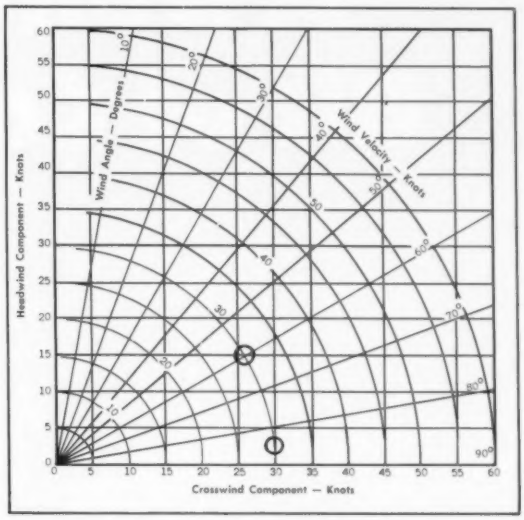


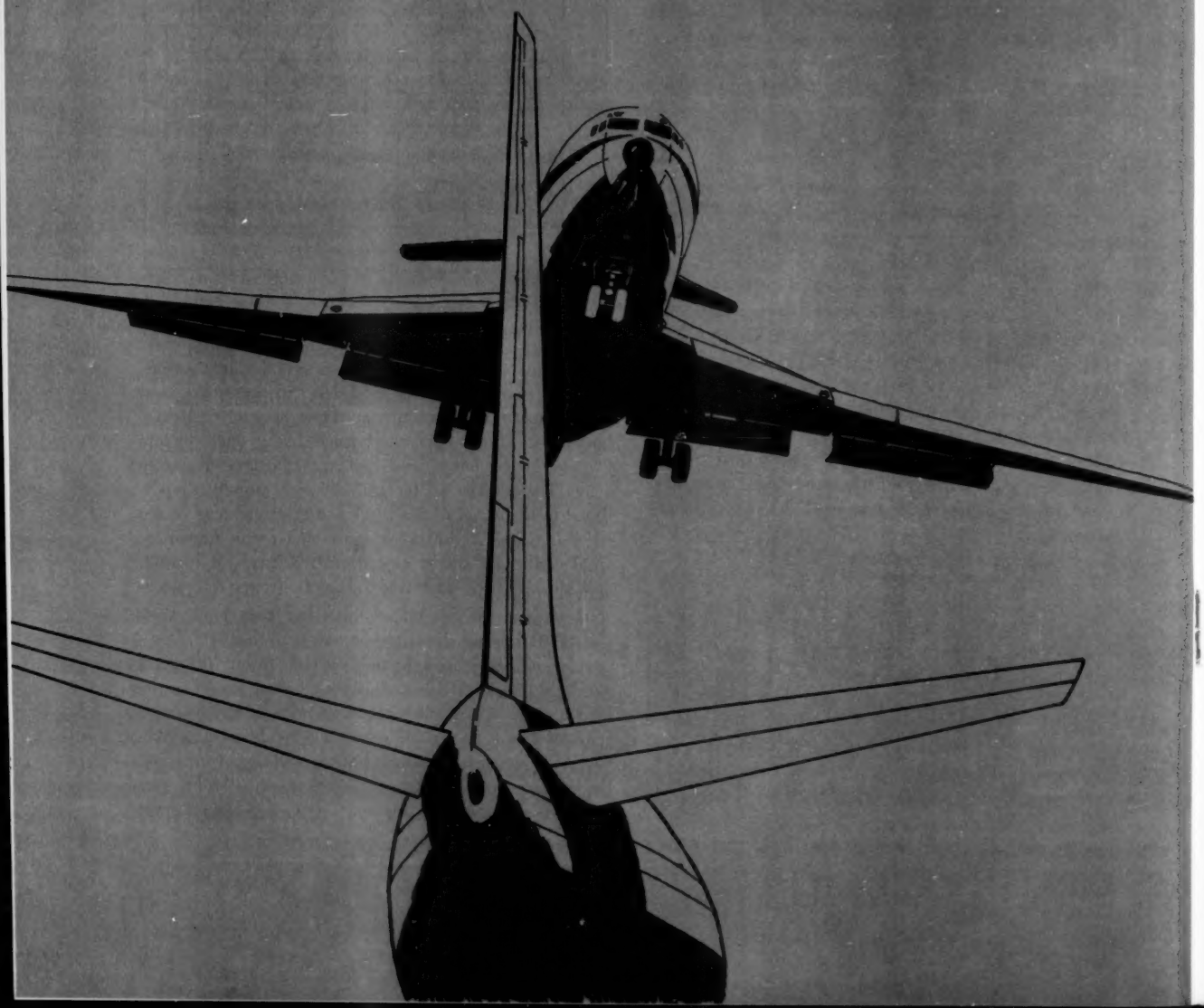
Figure 2. Typical Crosswind Chart

The crosswind, unfortunately, is not the only animal we have in our environmental zoo. Strong winds near the surface usually produce gustiness because of irregular terrain. Eddy currents formed by air and terrain friction in the lower levels are direct causes of turbulence. The severity of the turbulence is usually proportional to the speed of the wind and the roughness of the terrain. Gusts 10 knots or more above the prevailing wind can make almost any aircraft difficult to control.

While we were gathering this data from AWS headquarters, we found a few changes had been made since our pilot training days.

Anytime you can approach control, tower, or metro for local winds at the station where these facilities are located, you will receive magnetic winds. Any *forecast* wind on the 175-1 or any forecast wind from approach, tower, or metro for another station, will be a true wind. Remember: magnetic directions are given only for surface winds at the local station.

Mishap with a Moral: A Dangerous Bit of Confusion



A little bit of misunderstanding can set the stage for a major disaster. That's the moral in this mishap.

A DC-8 pilot from one nation, a 727 pilot from another, and a host-nation tower controller recently used short-cut phraseology and then each assumed things they shouldn't have. The result — a collision on the runway.

The Accident

About 2130 local time, the crew of a 727 held short of the runway as they waited for a DC-8 to land. Though it was after dark, with intermittent rain showers, the visibility between showers was good. When the DC-8 crossed the runway threshold, the tower controller instructed the 727 pilot to taxi into position and hold.

As the DC-8 rolled out, the tower operator instructed the crew to "take taxiway right — call on 121.7." The DC-8 pilot acknowledged, and the tower operator observed the well-lit transport turning towards the taxiway. Assuming that the DC-8 was clear of the active, he read the 727 crew their departure clearance and cleared them for an immediate takeoff.

However, the crew of the DC-8 understood the instructions as "back track if you like, change to 121.7," instead of "take taxiway right — call on 121.7." The DC-8 did turn toward the taxiway, but only to make a 180-degree turn to taxi back down the runway — directly toward the departing 727. And the DC-8 crew changed to ground control, so they did not hear the takeoff clearance issued to the 727.

Soon after the DC-8 started back down the runway, its pilot noticed landing lights coming toward him. He increased power and headed the airplane toward the side of the runway. Before he could get the DC-8 off the runway, the 727 rotated and lifted off over him. The DC-8 captain then felt a jolt, but he figured it was the nosewheel leaving the runway or contacting a runway light. The danger past, he maneuvered his airplane back to the center line of the runway and continued taxiing.

The 727 captain saw the other aircraft at about the time his aircraft reached 100 knots, but he felt it was too late to reject the takeoff, so he concentrated on using normal takeoff procedures, avoiding overrotation.

The tower operator saw the DC-8's landing lights turn and, assuming the DC-8 to be turning onto another taxiway, instructed the crew to continue taxiing straight ahead and cross runway 07. At this time the DC-8 crew saw the landing lights from another plane on final and informed the tower. It was at this time the tower operator questioned the crew about their location. When informed that they were still on the runway, the controller sent the approaching airplane around.

About this time, the 727 pilot reported that he had hit an aircraft during takeoff, had lost all his hydraulics, and was returning to land.

The controller then cleared the DC-8 pilot off the runway and informed him of the incident. The captain acknowledged and said that his aircraft was handling normally and proceeded to taxi to the terminal. There he found that a large portion of the vertical stabilizer was missing.

While ground crews cleared the runway of debris, the 727 crew dumped fuel and landed without incident.

Errors

There were several errors in this accident. First, the DC-8 crew copied the taxi clearance wrong, and the tower controller did not detect the error. Second, the controller cleared the 727 for takeoff, but the 727 crew did not clear themselves before releasing their brakes. And finally, the 727 captain did not abort the takeoff or use a steeper climb angle once he did detect the DC-8 on the runway. Both of these actions were determined to be within the 727's capabilities.

A conversation found on the 727's cockpit voice recorder was very interesting. Approximately 18 seconds before the collision, the 727 captain said, "How far ahead is he?" At this time he was traveling at 100 knots and had traversed about one-third of the distance from start-of-roll point to the other aircraft. Post-accident arithmetic showed that if the captain had elected to reject at that time he could have stopped his aircraft short of the DC-8.

Lessons

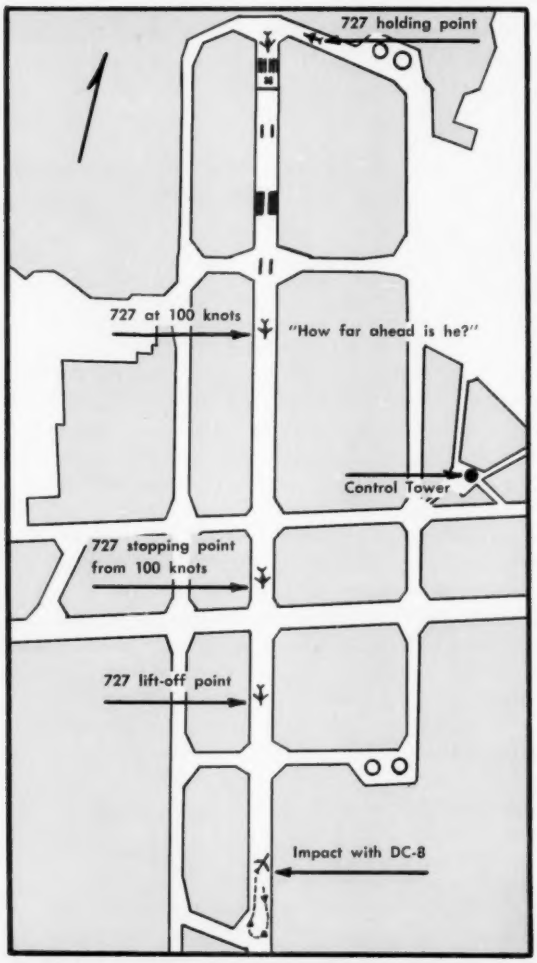
Luckily no one was injured in this mishap, but there are several lessons to be learned.

First, to prevent a misunderstanding between you and a controller always use standard phraseology and do not hesitate to ask the controller to "say again," if there is any doubt about what was said.

Adapted from Flight Safety Foundation and BOAC Air Safety Review

Second, be suspicious of what seems to be an unusual clearance. For example, wrong direction flight levels or, in this particular case, permission to taxi back on the active runway at a busy airport, especially when there are equally acceptable alternate routes.

Third, when you are instructed to change frequencies, you should also receive instructions when or where to change: for example, "change to 121.7 after clearing runway." Anytime you receive a clearance to use ground control while operating on the active runway — question it.



Significant stages of 727 and DC-8 operations.

Fourth, a tower controller should never assume an aircraft is clear of the runway unless he positively knows this by visual observation, ground radar, or a pilot report. Perspective between runways and taxiways over long distances can be very deceptive, as was the case in this accident.

And finally, it's your responsibility to double-check the runway and approach before taking the active or crossing a runway.

Several years ago we proved this last point when we had a similar accident in MAC. A Starlifter pilot made a smooth touchdown on the left of two parallel runways. At the end of his landing roll, he turned right, onto a taxiway, and proceeded towards the ramp. The aircraft was just beginning to cross the right runway when it was struck by a jet fighter on takeoff roll. Five MAC crewmembers died and one was injured. Both aircraft were destroyed.

The investigation showed that both aircraft were poorly lighted: The '141 was using only position lights and the fighter wasn't using landing lights for takeoff. To make matters worse, communications between the tower and the aircraft were poor. The tower operators said they had not cleared the '141 across the runway, but it was obvious that the crew felt that they had.

The investigation board charged the cause to pilot error because, cleared or not, the C-141 aircraft commander should have cleared himself visually before proceeding across the runway.

Even though English is the international language of aviation, it is sometimes difficult for one man to understand his native tongue when someone else applies the accents and brogues of another nation. When we compound the problem with bits of slang or verbal shortcuts, we can pretty well prevent communication. We don't even need to add assumptions, radio static, an unfamiliar environment, crew fatigue, limited visibility, a mechanical emergency, or any of a host of other factors, before the end is likely to be smoking wreckage. Just one or two of these can trigger a breakdown in communication, and that's all it takes to produce a dangerous bit of confusion.

AS PILOTS WE APPRECIATE the amount of time and hard work required to earn wings or a civilian pilot's license. Whether we fly light airplanes or the heavies for MAC, we all share a feeling of camaraderie — because we are pilots. But what about the FAA controller we talk to on the radio? Do we share this same feeling with him? If not, perhaps we should. He, too, is a pilot. To become a journeyman controller he had to earn, or previously have, his private pilot's license in addition to learning traffic control procedures. Not only that, but he has to maintain familiarity with the characteristics and performance of a wide variety of aircraft types while still maintaining his own flying proficiency.

Because of this training, he knows a lot more about our job (flying) than most of us know about his.

To help us understand his job a little better, we have found an interesting series of articles in *The Journal of Air Traffic Control* that might enlighten us about problems at the other end of our UHF/VHF transmissions. We offer one such article with the hope that Mr. Meng's comments will help all of us understand the system better. It may even prick your curiosity enough that you'll plan a trip to the nearest center or control facility to see the system in action.

Adapted from The Journal of ATC

"Read back is correct — contact tower on 259.1."

Controller to Pilot

By Charles H. Meng

Communication Prods

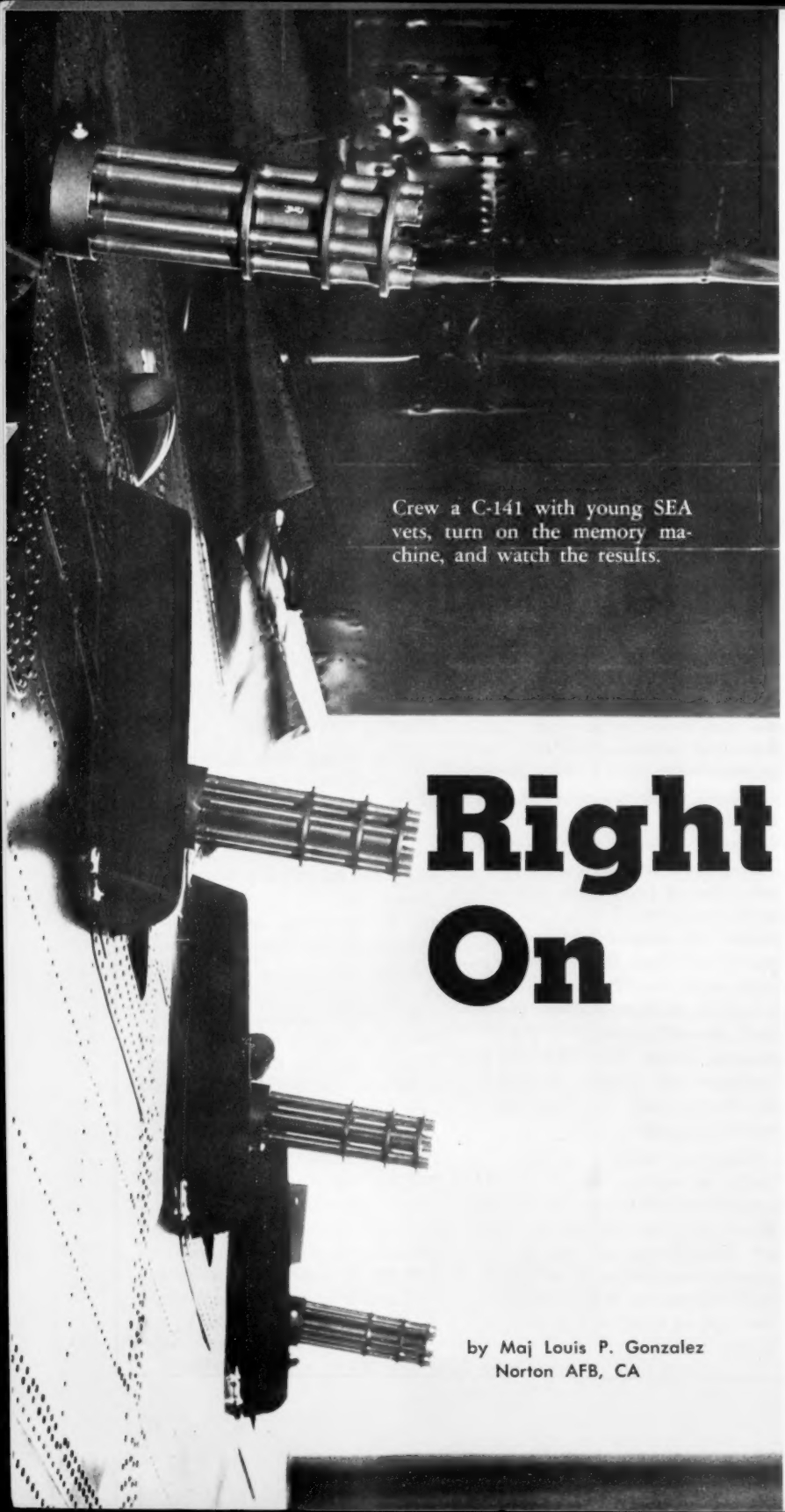
Assume that you are the only pilot in Ajax 42, flying on instruments at 7,000 feet in moderate turbulence with no autopilot, when the Center calls, "Ajax 42, clearance." The Center Controller reclears you via a different route from the one you have planned to a new clearance limit you have never heard of and asks for a clearance limit estimate; then before you have time to even locate your new route and clearance limit, much less compute the distance, the Controller transmits, "Ajax 42, forward a Confound estimate!" You locate Confound, measure the distance, and just as you pick up the computer, suppose the Controller rasps, "Ajax 42, what is your Confound estimate?" Would your thoughts be, "Dammit, if you'll stop distracting me one second, I'll give you an estimate?"

Similarly, when the Center Controller gets your original IFR departure clearance request, he immediately looks for the flight plan, determines altitudes available, coordinates with other Centers, issues clearances to aircraft ahead of you, and meanwhile separates traffic that is already airborne. As you sit at the end of the runway awaiting clearance, do you become annoyed and then say to the Tower, "Ask the Center what happened to my clearance?" or "Ask the Center how much more delay?" If you do, you might like to know that the Tower *really does* relay your prod, and the time the Center Controller spends picking up the telephone to answer the Tower could be better spent working on your clearance.

Once the Center Controller requests an estimate from you, of course you will forward it as soon as you can. Likewise, once the Center Controller knows you are requesting your clearance, he will issue it as soon as *he* can. Repeated interruptions in either case only delay the desired response.

Runway Occupancy

Pilots should delay their request for takeoff when they want to wait for the wake turbulence of a preceding departure to dissipate. A few pilots tell the controller they are ready for takeoff and upon being cleared they taxi onto the runway and sit. Controllers respect a pilot's concern for the effect of wake turbulence; however, a pilot waiting on the runway to avoid encounters with wake turbulence sometimes causes an aircraft on final to have to go around. If a pilot tells the controller he is ready for takeoff, naturally the controller issues a clearance with respect to traffic based on the fact that the departing pilot said that he was ready. Obviously the pilot is *not* ready for takeoff if he taxis into position, sits there, and *then* tells the controller he wants to wait for the wake turbulence to settle. The pilot on final approach would appreciate your waiting on a taxi strip instead of on the active.



Crew a C-141 with young SEA vets, turn on the memory machine, and watch the results.

Right On

by Maj Louis P. Gonzalez
Norton AFB, CA

WELL, IT LOOKS LIKE I finally got an all-SEA crew, and to tell you the truth, I prefer it that way," observed Ted, the Starlifter's young aircraft commander. He twisted around in his seat and proudly displayed his unauthorized Stinger Gunship name tag to his navigator, perched in the jump seat, and his copilot. "It seems like I'm running into more and more of the guys who did their thing to preserve freedom and democracy, plus earning a couple of shekels to fatten the old wallet. How about you, Sulli — what did you say you did over there in the land we grew to love?" Ted grinned across at his copilot, pleased with his facetious humor but wishing he had used his best W. C. Fields inflections.

"As little as possible, babe, as little as possible," replied Sulli, who was now approaching his 100th hour in this Lockheed kerosene converter (no mean trick with all the copilots around, he thought). "Actually, I was a FAC in 0-2s and then OV-10s out of Danang, home of the 'Professionals.'"

"Don't hand us all that 'Professional' garbage," butted in Johnny, the nav. "You guys would put us gunfighters in on a strike and then sit back and watch 'professionalism' in action. Why, our little old Fox Four Charles just about put that war out of business."

"Oh, yeah?" Sulli countered. "I saw quite a few of your 'Professionals' act just like a bunch of rookies. They never came back to thrill us with their jolly adventures."

"How about you, Eng?" Ted interrupted, playing the role of the tactful arbitrator.

"Jollies out of Udorn," said MSgt Hooks, "and sometimes I wish I hadn't cross-trained into this flakey outfit."

"You know, sarge, that's why I prefer guys like you on my trips.

Second Place Winner 1972 Writing Contest

You know what it means to be a professional. I'll tell you what *professionals* meant to me over there — it meant that you knew your job, and did whatever you had to do, legally or illegally, to get the mission accomplished. It finally gave you an opportunity to do some real flying, just like the old heads did during W-W Two."

"By the way," chimed in Johnny, "I saw the movie and it wasn't as good as the book."

"Okay, Magellan," Ted shot back, "that's enough of that Marconi humor. To me, this whole mission has been real professional and it helps back up my theory. And it really is true — I'm tired of these nothing-but-MAC-educated weenies who couldn't find their way to the crew latrine if they weren't guided by 55-1, ACP, and FCBs. Sure, I follow all the directives and checklists like they do, but I know where I can get by and eliminate certain assinine harassment items. I believe in saving myself to cope with the real emergencies that may arise. Some of these attached beauties really get to me — every time you fly with them, they really snow you about their *professionalism* in the big bird when all the time, quote 'professionally speaking' unquote," he snorted, "all they do professionally is plan their arrivals and departures based on when the BX opens and closes. Then to top it, guess who's bringing home a habachi pot?"

"Why don't we get this approach briefing out of the way now so we can fondly reminisce about our past heroics and plan our future ground moves for Honolulu? Those bird brains who planned this stop at Norton really planned this foul up 'professionally.' They probably put this whole thing in the computer and electronically planned us to miss all those warm rays in beautiful Hawaii-nei.

"Any questions on the briefing, crew?" Ted inquired proudly. "How was that for a glib tongue, babe?

"You ain't no Don Rickles," Sulli piped in, "but I guess you'll have to do."

"I'll disregard that last remark, copilot. Lemme tell you anyway about the most thorough briefing I've ever given. It was one night when we were going truck hunting in our dollar nineteen K-model. We were fragged up in Barrel Roll near Ban Ban where there was a big staging area and all kinds of triple-A. I briefed the crew on everything I intended to do and was really thorough — but my nav, old Bob Cranshaw, gave a spellbinder of a briefing that just about floored me. Hell, I knew right to the second when I was to break from the ground fire, our target description, terrain avoidance, and where all the safe areas were

for bailout. He briefed the fighter escorts on terrain and clearance and which way to move in as soon as beloved Charlie sent his pyrotechnical display to welcome us. Not only did he give all that, but he laid out a course and altitudes for escape and evasion in case of a MIG call. That guy —"

"MAC 70002, you're cleared to descend to ten thousand feet at pilot's discretion," Center interrupted.

"Right on, Center," Ted coolly replied. "Let's make a slow descent, guys. Sulli, roll the scrolls for a descent checklist, right by the books."

"I don't believe you, great Kahuna," spoke the nav in mock astonishment. "Why, you actually said something nice about us 'Pathfinders.'"

"I didn't say anything about *you*, Johnny. And I'm convinced that old Bob, deep down, always wanted to be a real aviator but couldn't make it through flight school."

"Oh, my aching auto-pilot. Will you listen to Wilbur Wright?"

"Don't knock the nav," Sulli joined in the jibing. "Those guys did a great job when I was first flying OV-10s, and kept me out of trouble more than once. I don't know how they ever spotted targets with that little old starlight scope through rotten weather — just like this typical Southern California garbage we're in right now — but if they said there was a target there, it was down there. Looking back I guess it wasn't really a bad year — not a *great* year, mind you — and even the mission I got shot down on wasn't too bad. Ha, ha!"

"I didn't know you took one in," Ted commented, a tone of admiration now showing he was giving Sulli a bit more respect than a moment before.

"Yeah," Sulli replied. "Me and my partner got too close to a mis-

guided SAM, and although we didn't take a direct hit, that Bronco just wasn't built for that kind of stuff. We had some control for awhile and thought we could get it back but we couldn't keep altitude. By the time we got out, the whole SAR network was alerted and we were picked up by some of your boys, Sergeant Hooks. Talk about 'professionals'! We wound up on either side of a 37mm site and the Jollies did a fantastic job getting us out. Fortunately, we had been working a couple of F-4s and if it hadn't been for those beauties, we'd be eating rice and fishheads today. I had one strike so damned close I thought . . ."

* * *

The board president punched the rewind button on the recorder and swore under his breath. "It's hard to believe, Mike — here's the Controller requesting their altitude and telling them he's lost their squawk. Listen while I play it through again, will you?"

"Right on, Center," Ted echoed again and again.

"Hell, I wish he *had* been 'Right on'; they might still be alive." The colonel shook his head disgustedly.

"I have no idea how guys like that could screw up so easily," commented the pilot rep. "Every man in the cockpit was a relatively recent SEA returnee with a flying background that wouldn't quit. Yet, there they went — right through a clearance altitude and into one of those unmovable mountains."

"Tell me, Mike," queried the president — "whatever kept you and me from having an accident like that?"

"Sir, I don't know. I'm sure they were going by the book. Must have been some big distraction or emergency — They couldn't have just flown right through an altitude like that . . ."

ABOUT THE AUTHOR

Maj Gonzalez is a navigator assigned to the 15 MASq, 63 MAWg, Norton AFB. He has served as a materiel control officer, as squadron and wing training officer, and has navigated aboard AC-119, C-124, C-135, and C-141 aircraft. Major Gonzalez has been selected by AFIT to pursue a masters degree in Personnel Management.

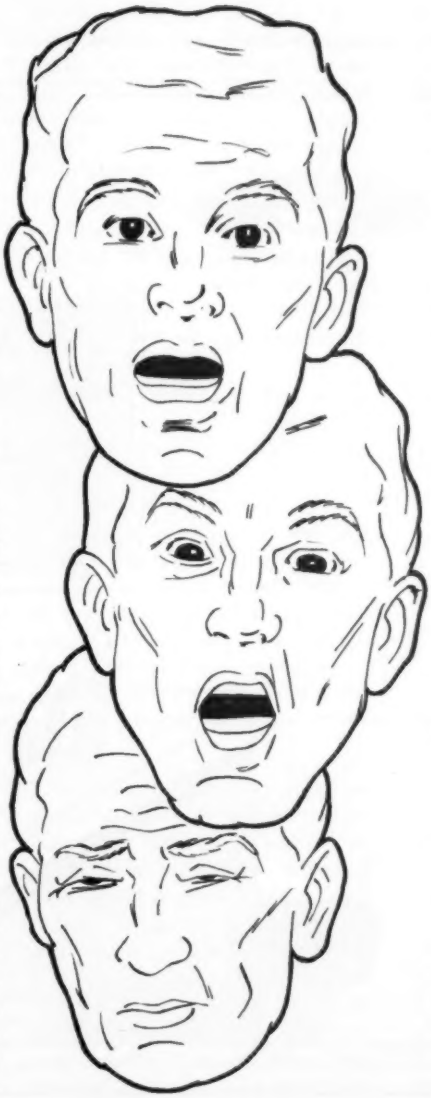
The story you're about to read is true, and it happened in MAC — not very long ago. It could happen again tomorrow. We sincerely hope it doesn't.

O-Two Snafu

IT WAS JUST BEFORE NOON when the copilot of a multimotor received clearance to climb from FL 240 to FL 330. As the aircraft passed FL 250, the pilot told his right-seater to have oxygen immediately available and then briefed the rest of the crew to have their oxygen readily available. When the crew leveled their craft at FL 330, a third pilot in the rear of the aircraft left his oxygen supply point and came forward to connect his mask to the copilot's walk-around bottle. Meanwhile, the crew received clearance to climb into block altitudes 330 to 350.

The aircraft was just passing FL 335 when — *bam* — a rapid decompression was caused by part of the copilot's side windshield blowing out. The pilot immediately ordered the crew to go on 100 percent oxygen. The copilot quickly went on 100 percent and started an emergency descent, while the pilot, navigator, and flight engineer put on their masks.

The third pilot was kneeling under the window when it blew out, trying to connect his mask to the walk-around bottle. He dropped to the floor to avoid being sucked through the hole and continued trying to connect his mask, but he was unsuccessful and passed out. The pilot was unable to communicate through his mask mike; the copilot's interphone cord had torn from the terminal strip and he too was unable to communicate. But the copilot did direct the engineer to squawk emergency and code 7700. Meanwhile the navigator held the leg of the unconscious third pilot, fearing that he might be sucked out the open window, and managed to connect the third pilot's oxygen, which revived him.



In the rear of the aircraft, the first scanner got on oxygen but a second scanner had trouble getting his helmet on, and when the mask slipped from his face, he passed out. The first scanner went to the second scanner's aid and revived him. As the first scanner tried to establish communication with the cockpit, he allowed his mask to disconnect from his walk-around bottle and he passed out. Now the second scanner revived the first scanner.

The pilot continued the descent and landed at a nearby Air Force base, using the navigator's interphone cord for communications. The crew was met by a flight surgeon and everyone was checked and subsequently released.

The time from the initial decompression until the aircraft was below 10,000 feet was just over a minute, but three people passed out.

The next time you fly, ask yourself this: Where's my oxygen mask, and how long will it take me to don it and establish communication? If it's more than 30 seconds at the "Readily Available" altitudes, you may be in a heap of trouble.

After three decades of experience, the Ace of Aerospace lives up to the number one curse of mishap preventers.

C.R. TERROR

IT WAS ALMOST 0930 and the flightline snack bar was nearly empty in the slack period between the early morning rush and the first of the coffee break crowds. Sally Strumpet, the waitress on duty, was listlessly wiping the counter with a damp rag when suddenly the door flew open and the World's Greatest Aviator, Major C. R. Terror, and his entourage of intrepid airmen burst into the room.

"Ahhhh! Good morning, Sally, m'dear!" the Rotund One cried as he came in. "I've finally gotten a daylight departure from home station so I can once again feast my world-weary eyes upon your delightful countenance before I tread the untrespassed sanctities of space." The Portly Pilot paused for breath as Sally tried to decide if what he had said was insulting. Before the confused girl could make up her mind, the Silver Tongued Fox continued. "Come m'love," he crooned, loosing the full intensity of the smile-known-round-the-world. "My crew and I must soon depart, but first we would taste again the beatific brew from yon silver urn, served of course from your own dear dimpled hands."

"He means we'd like a cup of coffee, Sally," translated Blinky Donovan, C. R.'s bespectacled navigator.

C. R. glared at the young navigator. "Blinky m'boy," he hissed through clenched teeth, "when I need your help communicating with the likes of this lovely lass — I'll let you know!"

"Sorry, chief," Blinky replied. "But we really don't have too much time and I was afraid you might get all involved and . . ."

"It's all right. Quite all right," the Able Aeronaut interrupted with a wave of his hand. "Just don't let it happen again."

Blinky wisely remained silent as Sally served them coffee, and the green garbed group settled themselves around a table. C. R. took a deep drag from the gold-ring Egyptian Oval in his ebony cigarette holder and pensively blew smoke toward the ceiling as he idly stirred his coffee. "What's the matter, chief?" inquired his lanky copilot, Long Suffering Sam. "You look like a man with something on his mind."

"Ah, nothing really," C. R. chuckled. "I was just remembering . . . Ya know, today is the fourth of July, and I was thinking about another fourth of July I spent flying once — a long time ago."

Sensing another of the Master Manipulator's marvelous war stories, Sam and Blinky drew their chairs closer to the table. "Go on," Sam encouraged. "What happened?"

"Well," C. R. began, "it was back during the big war. (You guys wouldn't remember it, but it was in all the papers at the time.) Anyway, I was a young lieutenant — about your age I'd guess Sammy — and I was flying the Hump in C-46s, and this one day — "

* * *

During the summer of 1942, the southwest monsoon brought particularly bad weather to Assam in the northeast section of India. At a small allied air base there, it was pouring rain as the sun tried to rise on the morning of the fourth of July. Inside a small soggy tent, a chubby young lieutenant named C. R. Terror struggled out from under his mosquito net and cursed the dawn. "Aw, rats," he mumbled as he stuffed his bulky body into a uniform and pulled a poncho over his head. "More rain. A couple more weeks of this weather and I'm gonna grow gills and swim down to the flight line." Finally dressed, and looking not unlike the tent in which he was standing, the pudgy young pilot slogged out through the mud and deluge toward the tin operations shed.

"Ah, good morning, Terror," the operations officer shouted cheerfully over the drumming of the rain on the roof. "Glad you could make it today."

"Aw, knock it off," the dripping pilot complained as he removed his hat and tried to shake the water off it. He clamped the hat, now reduced to a sodden shapeless mass by the constant rain, back on his head and looked at the scheduling board on the wall. "I suppose you want me to go flying in this crud."

"But of course," the operations officer replied, grinning broadly. "This is an all-weather Air Corps — haven't you heard? Don't you remember all that stuff about needle, ball, and airspeed?"

"Yeah, yeah, I know," the lieutenant growled. "Just tell me where I'm going, which ship I'm supposed to use, and what I'm taking."

"Well, if you're gonna get surly about it . . . You've got good old 7897, with a load of avgas, and you're going back to that P-40 base near Pei Dong. Any questions?"

"Nope," the young pilot replied, pulling his poncho tighter around his already ample paunch. "I reckon I can find my way there."

"By the way," the operations officer added as Lieutenant Terror opened the door to leave, "the

weather is rotten all the way to China and there's supposed to be a couple of Zeros operating over there this week. Keep an eye out for 'em, huh?"

"Don't worry, mother," C. R. bantered. "I've made this run better 'n 300 times. I'll get through again." He slammed the door behind him and slogged off through the now diminishing rain. Might not be a bad day after all, he thought to himself.

Arriving at the flight line, C. R. found the rest of his crew scrambling around the squatty, olive-drab Curtiss Commando. After looking around to make sure everyone was there, C. R. located the crew chief who was smoking a cigarette while sitting on a main landing gear tire under the wing, out of the rain. "How's it look, chief?" the Pudgy Pilot asked. "Is this thing about ready to fly?"

"Well, I wanted to talk to you about that, lieutenant," the sergeant replied. "I got a pretty high-time engine on this crate, and it's actin' kinda sick. I think maybe we'd . . ."

"Aw, come on now, sarge," C. R. chided. "There's a war on, remember? We can't afford to cancel or delay a mission every time an engine doesn't sound right. Those guys over there need gasoline. Besides, that's why they put two engines on this thing in the first place. Let's go!"

The sergeant considered trying to argue with the young pilot but, realizing the futility of it, he stifled his comments, stubbed out his cigarette on the oleo strut, and ambled toward the aircraft's door.

Moving his bulgy body with amazing agility, Lieutenant Terror scrambled through the cargo door and threaded his way up the steeply sloping cabin floor past the tightly-stacked 55-gallon drums of fuel. In the cockpit, he stuffed himself into the left seat and began flipping switches as he fumbled for his seat belt. His copilot, trying vainly to keep up with the Able Aeronaut, jumped into the right seat and strapped in just as C. R. hollered back into the cabin, "Come on you guys! Let's get the doors closed and crank this thing up!"

"Just a second, sir — we gotta little problem back here," someone shouted from the vicinity of the main cargo door. Seconds later the crew chief came forward and stuck his head into the cockpit.

"Lieutenant," he said, "this thing is really messed up. Those guys just broke the latch on the cargo door, and we can't get it to stay shut."

"Well, get a piece of rope or something and tie it shut," the Pudgy Pilot ordered. "I'm gonna start engines and taxi out. You let me know when you got it closed."

"Yessir," the sergeant replied, disappearing back toward the reluctant door.

Moments later both engines were running. C. R. punched off the parking brakes, and the big transport clattered forward over the rain-slick, PSP parking ramp. As he taxied, the pudgy pilot did his own version of an engine runup and discovered a healthy rpm drop on the left mag on number two engine. He didn't really worry about it, since the crew chief had already mentioned the possibility, and he knew he could jettison the cargo if things got bad.

Just as the King of the Hump swung the sturdy Curtiss Commando onto the runway, the crew chief reappeared in the cockpit. "We got the door shut, sir."

"Fine," C. R. barked, stiff arming the throttles. "Gimme max power an' let's get this heap off the ground!"

The heavily laden ship surged forward, lumbered down the runway gaining speed, lifted off, and soon headed north into the storm-filled sky toward China.

Later, while the aircraft was cruising in the clouds over the rugged Himalaya Mountains, number two engine belched and backfired slightly, twice.

"Oh, great!" C. R. commented as he shoved the mixture control to full rich. "Looks like this crummy thing is gonna give us trouble after all." The copilot nodded his agreement, but for a few minutes the engine smoothed out and ran normally. C. R. was starting to relax and considering trying to relean the reluctant recip, when suddenly — *KABLA-BLOOM!* The whole aircraft shuddered from the shock of a tremendous backfire from the number two engine and yawed hard right!

"We've lost it!" the copilot cried. "It quit!"

"Ya figured that out all by yourself, did ya?" C. R. commented dryly, as he struggled to control the suddenly crippled Commando. "Well, quit yapping, shut the crummy thing down, and gimme max power on number one!"

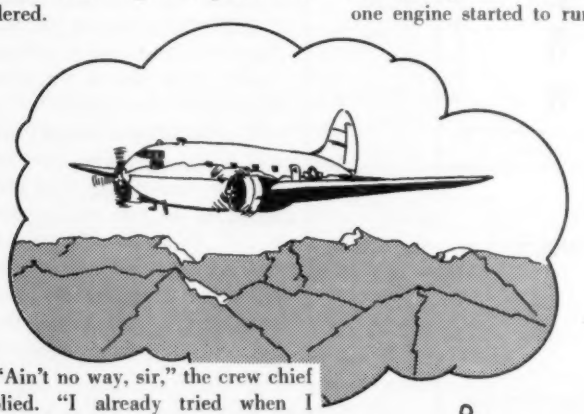
The chastised copilot quickly secured the engine and advanced power on the one remaining. By the time things were back under control, the crew chief appeared in the door — looking very concerned.

"What's the matter, chief?" the Pudgy Pilot in the left seat asked

him. "This doesn't surprise ya too much does it? Didn't you tell me we had one engine that wasn't doing too good?"

"*That* one," the crew chief replied, pointing to the stone dead engine on the right side of the aircraft, "*ain't* the one I'm worried about!"

"Aggggggh," C. R. gurgled as he saw the sinking altimeter confirming the crew chief's suspicions. Bending the throttle over the quadrant, the Pudgy Pilot played his last ace. "Jettison the cargo — quick!" he ordered.



"Ain't no way, sir," the crew chief replied. "I already tried when I heard the engine go. We tied both doors shut with a hunk of chain, and now the slip stream is pulling the door out and the chain's so tight we can't untie it. Even tried to cut it with a crash axe, but it's hopeless."

"We gotta do something," C. R. blurted, "some of these clouds got rocks inside of 'em!"

With the number two propeller standing stiffly at attention, the olive-drab transport sank lower and lower in the clouds, toward the jagged peaks below . . .

* * *

The old Master Manipulator of Wires and Tires paused and studied the dregs in his coffee cup.

"Jeeze, go on, chief!" Blinky exclaimed. "What happened then? How'd ya get out of that?"

"Well, we didn't really," C. R. replied ruefully, "although we gave it a helluva try. We chopped holes in the bottom of the airplane with the crash axe and then punched holes in all the drums and let the gasoline run out." He shook his head, remembering the incident. "It was kinda hairy, but we couldn't think of anything else to do. The number one engine started to run rough, so

I had to pull off some power to nurse it a little, and we kept getting lower and lower. Finally, after all the gasoline had drained out, we got out of the weather and found ourselves in a big valley. The engine was getting worse and worse, so I decided to plant the thing while I still had some power left. I put it down on the side of a hill and luckily it didn't burn. We all got out okay.

"The next day some Chinese guerrillas found us and guided us back to an American base. Took us three weeks to walk out and I lost 45 pounds. I'll never forget it."

"Man, I'd think so," Long Suffering Sam said. "That's quite a story."

Just then the door opened and Sergeant Max Torque, C. R.'s flight engineer, came in shaking his head. What's the matter, Max?" C. R. called to him. "Have we got troubles with the airplane?"

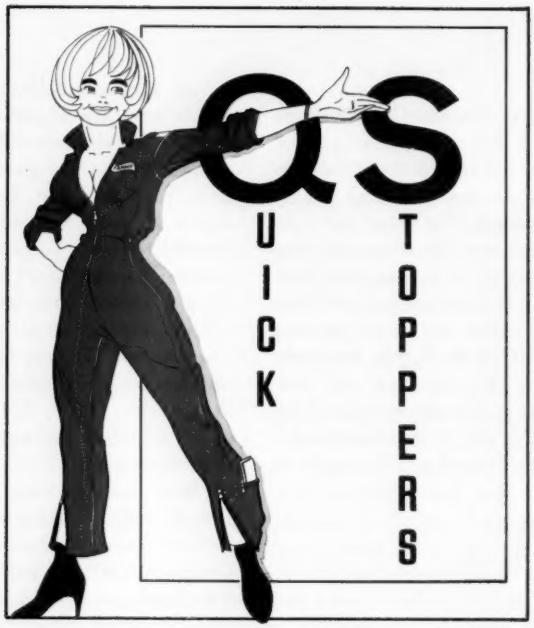
"We sure do, sir," Sergeant Torque replied, walking toward them. "This is about the tackiest airplane they've ever tried to palm off on us. The thing's got one TR unit inoperative, two CSDs disconnected, and a hydraulic problem. They've got the parts to fix it, but if they do, we'll be delayed quite a bit. They want us to take it like it is to the onload base and get it fixed while we're getting our cargo."

"Well, why not?" C. R. agreed, shoving his chair back and standing up. "That sounds good to me. We can get everything fixed and still be on time. That's the name of the game, sarge. They call, we haul; remember? Come on, let's get this vital airlift mission on the road!"

As the Aviator with Avoirdupois, followed closely by his flight engineer, ambled toward the door, Sam and Blinky stared at each other in stunned silence.

"Blinky," Sam finally said, "that's the same kind of decision he made in 1942! Do you think he'll ever learn?"

Blinky just smiled and replied, "Sam, with pilots it sometimes takes awhile to get their attention."



Shocking Short Showers Platform

While a C-141 was being refueled, a maintenance man spotted a shower of sparks coming from the crewrest platform. Electrical power was quickly disconnected and refueling operations stopped. The source of the sparks was found, all right: ecological pollution. It seems some of our crewmembers have been littering the platform with cigarette butts, pop-top can lids, gum wrappers, paper clips, and assorted junk. Apparently the biggest catch-all for this litter is the center beam of the platform, the one with the big round holes in the top. This center beam also houses electrical wires for the static line retriever winch. Metallic litter shorted out the electrical wiring and caused several disconcerting moments.

A modification to install protective covers over the holes is in the mill, but you should be aware that litter anywhere on the aircraft can be a hazard. Next time, it might shock you.

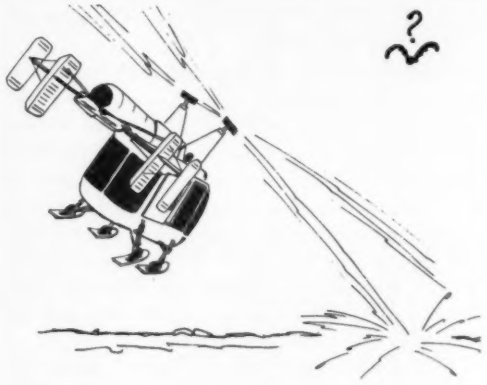
I'll Huff and I'll Puff . . .

A while back we did an article on the exhaust blast hazards of C-5 ground operations. In it, we mentioned something about the possibility of a pickup truck being blown across the ramp. As the article was being coordinated, someone objected to the example and accused us of exaggerating. At the time, we felt the criticism was probably justified, but we published the bit. Now we've just read a mishap report which proves we were right in the first place.

It seems a maintenance team was doing an engine run on a Galaxy and the big bird had power on all four engines set at 4.0 EPR. Along came a Chevy step van which belonged to the aerial port people. The van driver headed behind the C-5, and when he encountered the exhaust blast — 312 feet behind the aircraft — his vehicle executed a quarter slow-roll to the right. Then, while lying on its side, it was blown clear off the ramp onto the grass. The C-5 engine operator quickly pulled the throttles to idle on the advice of his scanner, and the step van driver emerged from his vehicle shaken but unhurt. Unfortunately, the step van *was* shaken — and hurt too.

We wonder if the man who was driving the van ever read our original article. If he had, he too probably would have accused us of exaggerating.

Collective Confusion Revisited



A March Quick Stopper raised a few eyebrows. It is reprinted below. Do you see an error?

> "A recent helicopter ding was caused by the pilot's apparent misunderstanding of a basic principle of fling-wing flying. An instructor pilot was demonstrating ground taxiing in an HH-43, with the beep in full decrease and almost minimum collective. Suddenly a gust of wind started to tip the bird over! The pilot tried to correct with cyclic — but he didn't increase collective, so his action had no effect. The Huskie fell on its side and tried to dig holes in the ramp with its rotors.
>
> "There's a simple rule of helicopter flying that the pilot should have applied, almost instinctively, in this case: *When in trouble on the ground, pick it up!* As soon as the bird started to tip, if the pilot had pulled in collective, he could have lifted to a hover and his troubles would have been over. Cyclic control — with no collective — isn't going to do much."

Our statement, "When in trouble on the ground, pick it up!," is true for the HH-43, *but* if you're flying a UH-1, for example, it might be different. Check your aircraft Dash One for the proper procedure for your bird. And for all who wrote telling us of our mistake: we ate our humble pie. Thanks.

Dazzling Lights

Aren't the lights of a big city dazzlingly beautiful when you make a letdown and approach to an urban airfield? They look like a sea of blinking, dancing, and swaying sparkles — a multicolor kaleidoscope. This truly impressive sight is probably even more breathtaking to those of us who enjoy light aircraft flying. But we think a word of caution is in order before anyone goes flying over a large city at night.

A recent midair collision between a Cessna 150 and a Boeing 707 points out a very dangerous condition — the inability of any flight crew to see an aircraft against a background of city lights. The 707 was descending through 4,000 feet when it hit the unseen 150. Fortunately, the 150 made an engine-out crash landing and the 707 recovered safely.

Hobby jocks, please note: if you plan on doing any night flying in a high-density area without being under radar control, familiarize yourself with the traffic flow patterns in the area. Better yet, don't mess around in high density areas at night.

Seeing Begins with Focusing

A man with only fair vision who knows the rules for good seeing is far better off than a man with superior eyesight who doesn't know how to take a good look. We've all been alerted by ATC to traffic that we've never seen, or not seen until he is overhead or passing off our wing tip. Here is a trick of the trade that might help you spot these guys.

To see something, you must focus on it. If you're staring out the windshield at blue sky, heavy haze, clouds, darkness, or nothing, your eyes most likely will focus at about three to six feet — and that's not good. The trick is to make your eyes focus at optical infinity and then look out into the glaring void for that traffic you were alerted to. To do this, focus on anything over 30 to 35 feet away. Your wing tip, a cloud edge, or the ground will work. Then look for the traffic. Your eyes will remain focused at infinity for about 20 to 30 seconds. Try it — you might find a few more of those bug smashers rapcon keeps warning you about.

Fatal Foul-up

A civil aircraft crashed at 1,600 feet MSL, 10 miles from an east coast airport, killing four and seriously injuring four others. The accident investigation board determined that the pilot should have been at 2,200 feet MSL using the VOR approach that he was cleared for.

A second look at the approach book brought up a very interesting fact. There were two VOR-1 approaches off two different VORs, and to two different but closely situated airports in the same town. Both of these approaches had the name of the town, twice, very close to "VOR-1." It was concluded that haste, poor lighting, or other factors may have caused the pilots to select the wrong plate for the approach they were flying. Therefore, they descended to 1,600 feet vice 2,200 feet, and the aircraft crashed into high terrain.

An approach plate foul-up shouldn't happen in MAC. We have three people looking at the plate, the approach is briefed on the descent checklist, and the pilot should give some type of progressive briefing throughout the approach. But, Murphy has done it to us before. A thorough briefing and a reconfirmation between crewmembers of all altitudes, headings, frequencies, and clearances should prevent this type of accident from happening.

Cause Factor Categories

"Operator factor in that the pilot failed to . . ."

These words are familiar to anyone who has been in the safety business for long, but for one man, Mr. Jerry Lederer from the Flight Safety Foundation, there's a conviction that they might not be familiar enough. Mr. Lederer, in an article in a Flight Safety Foundation Newsletter, suggested that the statement cause factor should indicate not only that the pilot made a mistake, but *why* he made it.

Mr. Lederer offered the following five categories of operator error, with specific examples:

1. Induced by design. (Misreading a poorly designed instrument or indicator.)
2. Lack of training. (Misusing asymmetrical reverse thrust after a training program which did not teach the proper technique.)
3. Deliberate action or failure to act. (Attempting an unauthorized maneuver or not using a checklist.)
4. Environment. (A peculiar airport hazard.)
5. Psychological or physiological factors. (These would include vertigo, illusions, operational pressures, etc.)

Breaking down operator errors by these categories should help pinpoint areas which require corrective action. Admittedly, this can only prevent the next accident (which is not the way we like to work) but it could make our accident report findings more meaningful.

Comments, anyone?

after deadline . . . .

WEATHER CUTBACK -- Starting 1 July, forecaster services at Charleston, Dover, McChord, and Norton will be reduced. Any aircrew needing a weather briefing from 2000 to 0400 local must contact the appropriate regional weather station -- McGuire or Travis -- via telephone. Also, current weather depiction and wind flow charts will no longer be part of the MAC weather folders after 1 July. True, this is a reduction in the weather support we are accustomed to. But look at the positive side: though some nice-to-have things will go, the need-to-have services will still be there.

KUDOS DEPT -- Charleston's 76th Military Airlift Squadron celebrates their 20th anniversary in MAC this month. The unusual thing is that all 20 years have been accident free. Congratulations! Look for a special feature in August.

10,000 JET? -- Along with a recent batch of 10,000 hour award nominations from McChord, we received a query. The safety officer wanted to know if Lt Col Wilson S. Decker, recently of the 4 MASq, was the first MAC-man to amass 10,000 hours of accident-free flying time in jets. We didn't have an answer; our records do not contain information this specific. How about it, readers! -- was Colonel Decker the first?

JABARA AWARD -- The Superintendent of the Air Force Academy is seeking nominations for the 1972 Jabara Award for Airmanship. Criteria: the nominee must be a USAF Academy graduate; his actions must set him apart from his contemporaries; and his accomplishments must be directly associated with an aerospace vehicle. The award is to be presented on 11 Nov 1972 at the Academy. Nominations must reach MAC/DPSP before 25 Aug 1972. Your nearest MAC CBPO has DPSP message 251800Z May 72 -- contact them for more details.

COMING ATTRACTIONS -- In our August issue, you'll find a discussion of nonprecision approaches, a look at how to use a life raft for arctic survival, a tale about a crosswind landing gone haywire, and a bighelping of a recent phenomenon: Letters to our editors.

the ANALYZER

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